

Pawnee Montane Skipper Butterfly Recovery Plan



Prepared by:

*Bettina Proctor
Partnerships Coordinator
U.S. Fish and Wildlife Service
Region 6*

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PAWNEE MONTANE SKIPPER

RECOVERY PLAN

Prepared by the Pawnee Montane Skipper Recovery Working Group
for
Region 6
U.S. Fish and Wildlife Service
Denver, Colorado

Bettina Proctor
U.S. Fish and Wildlife Service
Region 6
Denver, Colorado

Terry Ireland
U.S. Fish and Wildlife Service,
Region 6
Grand Junction, Colorado

Scott Ellis
ENSR
Fort Collins, Colorado

Janet Coles
Colorado Natural Areas Program
Denver, Colorado

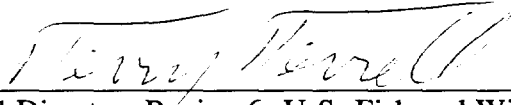
Denny Bohon
U.S. Forest Service
South Platte Ranger District
Morrison, Colorado

Frank Kunze
Jefferson County Open Space
Golden, Colorado

Paul Opler
Biological Resources Division
U.S. Geological Survey
Fort Collins, Colorado

Bob Taylor
Denver Water Department
Denver, Colorado

Don Kennedy
Denver Water Department
Denver, Colorado

Approved: 
Regional Director, Region 6, U.S. Fish and Wildlife Service

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ACKNOWLEDGMENT

This Recovery Plan is dedicated to working group member, Bob Taylor, Denver Water Department, who passed away as the Plan was being finished. We are grateful to Bob for his interest in and concern for the Pawnee montane skipper and his energy and unflagging sense of humor which helped guide us.

DISCLAIMER

Recovery plans delineate reasonable actions which are believed to be required to recover and/or protect listed species. Plans are prepared by the U.S. Fish and Wildlife Service and are sometimes prepared with the assistance of recovery teams, contractors, State agencies, and others. Objectives will be attained and funds expended contingent upon appropriations, priorities, and other budgetary constraints. Recovery plans do not necessarily represent the views or the official positions or approval of any individuals or agencies, other than the U.S. Fish and Wildlife Service, involved in the plan formulation. They represent the official position of the U.S. Fish and Wildlife Service only after they have been signed by the Regional Director or Director as approved. Approved recovery plans are subject to modification as dictated by new findings, changes in species status, and the completion of recovery tasks.

Literature Citations should read as follows:

U.S. Fish and Wildlife Service. 1998. Pawnee montane skipper butterfly (Hesperia leonardus montana) recovery plan. Denver, Colorado. 16 pages.

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5430 Grosvenor Lane, Suite 110
Bethesda, Maryland 20814

telephone: 301/429-6403 or 1-800-582-3421

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e-mail: fwrs@mail.fws.gov

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EXECUTIVE SUMMARY

Current Status: The Pawnee montane skipper (*Hesperia leonardus montana*) is listed as threatened. The only known population occurs on the Pikes Peak Granite Formation in the South Platte River drainage system in Colorado. Estimated total known habitat is 37.9 square miles and is owned and/or administered by the Denver Water Department, the U.S. Forest Service (Pike National Forest), Jefferson County, and private individuals.

Habitat Requirements and Limiting Factors: Pawnee montane skippers inhabit dry, open Ponderosa pine woodlands with sparse understory at 6,000 to 7,500 feet with moderately steep slopes and with soils derived from Pikes Peak granite. Blue grama grass, the larval food plant, and prairie gayfeather, the primary nectar plant, are two necessary components of the ground cover.

Recovery Objective: Delisting

Recovery Criteria:

1. Protect and maintain through proper vegetation management, all of the defined skipper habitat on public land in the South Platte River drainage.
2. Avoid habitat fragmentation.
3. Ensure that skippers are distributed throughout the range.

Actions Needed:

1. Create Memoranda of Understanding among land management agencies to provide for maintenance and enhancement of habitat.
2. Monitor skipper presence in habitat.
3. Monitor skipper habitat quality and trends.
4. Determine management criteria for habitat maintenance.
5. Educate private landowners and seek opportunities for conservation agreements to allow enhancement of skipper habitat on private lands.

Total Cost of Recovery: \$330,000

Date of Recovery: 2010

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PART I - INTRODUCTION

Description

The Pawnee montane skipper is a member of the skipper butterfly family (Hesperiidae) and was first described in 1911 as Pamphila montana (Skinner 1911). Scott and Stanford (1982) combined two species (Hesperia pawnee and Hesperia leonardus), retained the specific name leonardus, and treated the Pawnee montane skipper as Hesperia leonardus montana. It was officially listed as Hesperia leonardus montana in the Federal Register as a threatened species on September 25, 1987 (52 FR 36176).

The Pawnee montane skipper is a small brownish-yellow butterfly with a wing span slightly over 1 inch. Small, fulvous (dull brownish-yellow), usually distinct spots occur near the outer margins of the upper surface of the wings, while one to four distinct brownish to off-white spots occur on the lower (ventral) surface of the wings. The ventral spots are larger on the hind wing and generally are whiter in the female butterflies.

Distribution

The Pawnee montane skipper (skipper) occurs only on the Pikes Peak Granite Formation in the South Platte River drainage system in Colorado, involving portions of Jefferson, Douglas, Teller, and Park Counties. Two other subspecies are in this group, including Hesperia leonardus leonardus in the eastern United States and Canada, and Hesperia leonardus pawnee in the Northern Great Plains. The presence of ventral hind wing spots and its darker color differentiates Hesperia leonardus montana from Hesperia leonardus pawnee (Scott and Stanford 1982).

An intensive distribution survey was conducted within the South Platte drainage by the consulting firms of Environmental Research & Technology, Inc. (ERT) and Professional Entomological Services Technology, Inc. (PEST) during August and September 1985. They found the range of the skipper to be centered at Deckers, Colorado, and to extend northwestward just beyond Pine, Colorado, and southward to the point where the county lines of Teller, Park, Jefferson, and Douglas Counties nearly converge. This total area is roughly 23 miles long and 5 miles wide. The total known habitat within this range is estimated to be 37.9 square miles.

The area occupied by the skipper is owned and/or administered by the U.S. Forest Service (Pike National Forest), Jefferson County, Colorado State Land Board, and the Bureau of Land Management. Denver Water Department and private individuals own the rest of the habitat.

Habitat/Ecosystem

The skippers occur in dry, open, Ponderosa pine (*Pinus ponderosa*) woodlands at an elevational range of 6,000 to 7,500 feet. The slopes are moderately steep with soils derived from Pikes Peak granite. The understory is limited in the pine woodlands. Blue grama grass (*Bouteloua gracilis*), the larval food plant, and the prairie gayfeather (*Liatris punctata*), the primary nectar plant, are two necessary components of the ground cover strata. Small clumps of blue grama occur throughout the warm, open slopes inhabited by skippers. Prairie gayfeather occurs throughout the ponderosa pine woodlands. Skippers are very uncommon in pine woodlands with a tall shrub understory (Keenan et al. 1986) or where young conifers dominate the understory (ERT 1986).

Based on quantitative skipper occurrence studies (ERT 1986), general characteristics of Pawnee montane skipper habitat include:

- Tree canopy cover of 30 percent.
- Ponderosa pine crown cover of 25 percent, Douglas fir crown cover of 5 percent.
- Tree density of less than 120 trees/acre in the smallest size class (0 to 5 feet diameter breast high); overall tree density of less than 200/acre.
- Shrub and grass cover generally less than 10 percent.
- Prairie gayfeather flower stem density ranging from 50 to 500/acre.
- Blue grama cover 5 percent or less, present nearly everywhere.

The vegetative community preferred by the skipper is a northern-most extension of the ponderosa pine/blue grama grass habitat type documented from southern Colorado and northern New Mexico. However, the preferred nectar plant of the skipper, prairie gayfeather, does not occur in similar habitats to the south. The northeastern limit of the ponderosa pine/blue grama grass community overlapping with the southwestern limit of the prairie gayfeather may contribute to the maintenance of the species in this limited area. Its existence in this limited and specialized area accentuates the ecological precariousness of the skipper.

Life History/Ecology

Pawnee montane skippers emerge from their pupae as adult butterflies in late July. Usually males emerge before females by an average of 7 to 10 days. Adults spend most of their short existence feeding and mating. Adult females deposit eggs singly and directly on leaves of blue grama grass, which is the larval food plant (Scott and Stanford 1982, McGuire 1982, Opler 1986). The species overwinters as young larvae, and little is known of the larval and pupal stages. Pupation is generally short (13-23 days) in most butterfly species. The skipper

completes its life cycle (egg to larva to pupa to adult butterfly to egg) annually (Keenan et al. 1986).

ERT (1986) indicated that adult skippers probably fly until a major killing frost occurs. They also stated that the skippers emerge when the prairie gayfeather flowers. During 1986, the prairie gayfeather began blooming in late July, which coincided with the first observation of adult Pawnee montane skippers. The prairie gayfeather was still being used as the preferred nectar source when the last Pawnee montane skipper observations were made on September 17, 1986.

The prairie gayfeather apparently requires openings from single event disturbance such as logging or fire-created habitat but does not tolerate continuous disturbance. However, the skipper apparently does not colonize fire-created areas for at least several years after disturbance and regeneration. Burnt or logged areas surveyed in 1986 had low numbers of Pawnee montane skippers (Opler 1986).

Although prairie gayfeather is the most important nectar source for the species, other plants have been noted as occasional nectar sources. Of these, musk thistle (Carduus nutans) is especially important along river bottom edges and up some ravines. Female Pawnee montane skippers were seen in large numbers on musk thistle along the South Platte River (Opler 1986). The musk thistle is classified as a noxious weed by Jefferson County. The aster (Aster laevis) is used by skippers in upland areas and along gully bottoms where soil moisture is greater.

Other plants used occasionally include Canada thistle (Cirsium arvense), beebalm (Monarda fistulosa), geranium (Geranium caespitosum), sunflower (Helianthus sp.), and Senecio (Senecio spartioides).

Population Status

Population estimates for 1985, 1986 and 1987 were based on census survey transects and distribution survey counts (ERT 1986a, 1986b, 1988). The distribution surveys were done by plotting a 200-pace transect within each quarter/quarter section (40 acres) of each quarter section assigned for sampling. Observers counted gayfeather, blue grama and skippers along the transects. The census surveys were done on 48 randomly sampled 400 meter transects.

The 1985 population estimate was 80,000 to 140,000; in 1986 the estimate was 67,900 to 166,100; and in 1987, the estimate was 116,000. These estimates are believed to be current, although no more recent surveys are known.

Reasons for Listing

The skipper's narrow habitat preference combined with limited availability of this preferred habitat results in the skipper being restricted to only one area. Habitat loss likely has occurred

over the last 120 years of fire suppression. Encroachment of conifers and subsequent loss of grasses and Liatris reduce the quality and quantity of skipper habitat. Past habitat loss or degradation also probably occurred when Cheesman Reservoir was constructed and when communities within the skipper's range were developed. No early distribution or range information exists to determine whether there was loss or to what extent this may have occurred. Another adverse impact on skipper habitat has been increased use by off-road vehicles. More recreation cabins, homes in the Pine Valley Ranch and new roads have added to the impacts. Another current impact is the pine beetle control program on lodgepole pines. Although the skippers do not live in the lodgepole pine ecotype, the roads used for beetle control, stockpiled logs or vehicles parked in meadows may impact skipper habitat.

At the time of listing, the skipper habitat was threatened by the proposed construction of Two Forks Dam and Reservoir by the Denver Water Department and development associated with the proposed reservoir. An estimated 22 percent of the habitat would be lost and result in a loss of 23 percent to 42 percent of the population, if the reservoir were constructed. A No Jeopardy biological opinion with required conservation measures was released in October 1987. In 1990, the U.S. Environmental Protection Agency did not approve the construction of the dam and the project was shelved. The immediate principal threat to the skipper's habitat was removed. However, in the long term, plans to develop a reservoir in the South Platte drainage which would negatively affect skipper habitat may resurface.

Because of the limited habitat and range of the Pawnee montane skipper, unexpected random (stochastic) events also could have major deleterious effects on the population. Population biologists (Ehrlich and Murphy 1982) assert that random population changes due to stochastic events are more likely to cause the loss of small populations than are genetic changes. Stochastic events that could prove disastrous to the skipper cannot all be predicted. However, the following are some examples: (1) late spring hard freezes, (2) early fall extended storms, (3) disease outbreaks that decimate nectar or caterpillar host plants, (4) accidental spraying of skipper range with insecticide, (5) introduction of a competitor or competitors for caterpillar food, (6) decimation of host grass by other insects, (7) decimation of skipper population by parasitic insects, (8) changes in microclimate (Opler 1987a).

Invasion of noxious weeds, such as knapweed, which may out compete blue grama and Liatris, are also a serious threat to the skipper.

A twenty-fold fluctuation in butterfly numbers is common. If only smaller reserve units are left due to fragmentation of habitat, they should be connected by the preservation and active management of intervening units in order to allow for genetic exchanges. Preservation of populations in both the South and North Forks to buffer against a single event or combination of events that might eliminate the butterfly from one of these areas is important. High-quality low elevation habitats as well as the higher elevation habitat should be protected also.

Current Conservation Measures

When Forest Service management practices adversely affect Pawnee montane skipper habitat, the Forest Service is required to work with the Fish and Wildlife Service to develop conservation measures. When Forest Road 550 was widened, for example, approximately one acre of skipper habitat was impacted. The area was reseeded with prairie gayfeather and blue grama in test patterns, with and without topsoil, gayfeather alone and mixed with blue grama, to determine which practice is most successful. Seed regeneration was poor in this area across all test treatments.

Some forest management practices such as timber sales and Christmas tree sales generate funds which may be used to enhance skipper habitat. The Forest Service will monitor the enhancement activities to determine if they are effective.

A wildfire in the Buffalo Creek area in 1996 affected 350 acres of skipper habitat. Approximately 200 acres burned under moderate to low intensity and 150 acres burned under high intensity. Based on current information, blue grama and gayfeather still occur on these acres. The Forest Service will create additional habitat acres within the burn area. New skipper habitat possibly will be created naturally because of the opening of the forest by the fire.

The Jefferson County Open Space Management Plan (1988) describes 250 acres of Pawnee montane skipper habitat on the Pine Valley Ranch Park. Potential for improvement of skipper habitat exists on some of this property through timber management. At this time, no management has been done.

PART II - RECOVERY

Objective

The objective of the Recovery Plan for the Pawnee montane skipper is to remove the species from the list of threatened species by ensuring the protection of the species' habitat for the foreseeable future.

Criteria for Delisting

The Pawnee montane skipper will be considered for delisting when it is demonstrated that:

1. There is a high probability of long-term persistence of the species and its preferred habitat. Because a twenty-fold fluctuation in butterfly numbers is commonly encountered, the focus for recovery must be on habitat protection, not population numbers, at any given time.
2. Skipper habitat on public land is protected and maintained within the defined habitat of the South Platte River. Fragmentation of habitat must be avoided and skippers must be distributed throughout the range. Populations in both the South and North Forks must be protected to buffer against a single event that might eliminate the butterfly from one of these areas.

Step-down Outline

1. Create Memorandum of Understanding among land management agencies to provide for maintenance of habitat.
 - 1.1 Modify or eliminate activities with the following major defined effects.
 - 1.1.1 Activity that destroys more than 5 percent of any population's habitat area.
 - 1.1.2 Habitat-displacing activity located in an area of prairie gayfeather density of 150 or more flowering stems/acre.
 - 1.1.3 Activity that creates large blocks of unsuitable habitat.
 - 1.2 Control activities with the following moderate defined effects.

- 1.2.1 Campgrounds located in areas of moderate skipper densities or in areas of moderate prairie gayfeather density, and that involve less than 40 acres.
 - 1.2.2 Narrow paved or improved roads that impact areas of prairie gayfeather concentrations of less than 150 stems/acre.
- 2. Monitor Trends.
 - 2.1. Monitor trends in skipper presence.
 - 2.2 Monitor trends in skipper habitat quality and extent.
 - 3. Determine if disease, parasitism, or predation is a threat.
 - 4. Determine effects of management regimes for habitat maintenance and enhancement.
 - 4.1 Determine effects of forest management practices on skipper populations.
 - 4.2 Determine effects of recreation management, including roads, trails and off-road vehicle use on skipper habitat.
 - 4.3 Determine effects of off-road vehicle use.
 - 5. Perform noxious weed control by hand.
 - 6. Encourage private landowners to voluntarily manage habitat.
 - 6.1 Educate private landowners.
 - 6.2 Seek conservation easements.
 - 7. Educate general public.

Recovery Actions

1. Create Memorandum of Understanding among land management agencies to provide for maintenance of habitat.

Agencies with interest in the skipper's habitat area are the Denver Water Department, U.S. Forest Service, Jefferson County, Douglas County, Colorado State Land Board, Colorado State Forest Service, Bureau of Land Management and the U.S. Fish and Wildlife Service. An MOU which provides an agreement among these agencies on land management practices will protect Pawnee montane skipper habitat on public lands. The MOU will address controlled burns, grazing, logging, road-building and other physical ground disturbance, noxious weed control and other management activities which might impact skipper habitat. The MOU will provide for review of activities with major or moderate defined effects with recommendations for modification, control or mitigation of the effects.

1.1 Modify or eliminate activities with the following major defined adverse effects:

- 1.1.1 Elimination of more than 5 percent of any population's habitat area. There are three general populations: 1) North Fork population area; 2) main stem South Platte River from the North Fork/South Fork confluence to Deckers, including Horse Creek; 3) and Cheesman Reservoir area.
- 1.1.2 Habitat-displacement in an area of prairie gayfeather density of 150 or more flowering stems/acre (optimum gayfeather density for skipper habitat from Opler 1987a).
- 1.1.3. Creation large blocks of unsuitable habitat (over 40 acres for rectangular blocks or over 200 meters wide for linear disturbances). Large paved parking lots, wide paved roads with broad, graveled shoulder and adjacent herbiciding, reservoirs, wide power line rights-of-way treated with herbicides, subdivisions with large lawns, cultivated plots, or heavily grazed habitat are activities likely to create adverse effects.

1.2 Control the following activities which produce moderate defined adverse effects:

- 1.2.1 Campgrounds that are located in the areas of moderate skipper densities or in areas of moderate prairie gayfeather density (less than 150 flowering stems/acre), and that involve less than 40 acres covered by parking lots, lawns, ballfields, or scraped areas.

- 1.2.2 Narrow (one lane with occasional pullouts) paved or improved roads that impact areas of prairie gayfeather concentrations of less than 150 stems/acre.

2. Monitor Trends

2.1 Monitor skipper presence.

- 2.1.1 Skipper presence in the available habitat will be monitored every five years to determine trends and habitat use. Three years of data are available from 1985, 1986 and 1987 in reports to the Denver Water Department (ERT 1986, 1987, 1988).
- 2.1.2 Transect walks can be repeated for year-to-year comparisons. If skippers are not found in previously used habitat, efforts such as population censusing and habitat evaluation will be made to determine the cause.
- 2.1.3 If the cause of skipper absence in previously used habitat is related to habitat loss or alteration, the land management agencies which are partners in the MOU will initiate actions to improve the skipper habitat.

2.2 Monitor skipper habitat quality and trends.

- 2.2.1 Flowering gayfeather stems will be counted simultaneously with skipper presence surveys so that climatic differences between years can be estimated.
- 2.2.2 Estimates of density along the transect lines will be conducted during the peak skipper emergence period. Aerial baseline maps were developed by ERT (1986) for the Denver Water Department. Following the Buffalo Creek Fire (1996), the Forest Service mapped the burn perimeter and took many photographs of the area.
- 2.2.3 Changes in vegetation will continue to be documented.
- 2.2.4 Aerial imagery and GIS will be used at five to ten year intervals (except in the case of a major stochastic event) to record habitat variables which can be compared over time.
- 2.2.5 Walkover surveys can be done at the same time to identify areas of unexpected surface disturbance, fires, and tree disease.

2.2.6 It may be appropriate to resample tree and shrub variables on permanent transects after long periods (5 to 10 years) to examine successional relations within woodlands.

3. Determine if disease, parasitism, or predation is a threat.

3.1 If disease, parasitism, or predation are found to be contributing to the butterfly's decline, methods for decreasing the threat will be sought.

4. Determine management regimes for habitat maintenance.

Maintaining the appropriate habitat is essential to the survival of the Pawnee montane skipper. Research has determined the optimal habitat variables for skippers and the range in which they are found. It will be necessary to determine how to maintain the habitat to sustain the skipper populations.

4.1 Determine effects of forest management practices on skipper populations.

4.1.1 Seek every opportunity to provide additional high quality skipper habitat through maintenance of tree canopy cover of 30 percent and tree density of less than 220/acre.

4.1.2 After physical ground disturbance in skipper habitat areas, land management agencies will use native seed mix including prairie gayfeather and blue grama to reclaim the affected area.

4.2 Determine effects of recreation management, including roads and trails.

4.2.1 Population and occurrence studies will take into account the presence of roads and trails and how they affect skipper numbers.

4.2.2 Recommendations will be made to highway departments or other governments which do revegetation in the skipper habitat that a native plant mix including prairie gayfeather and blue grama be used.

4.3 Determine effects of off-road vehicle use.

4.3.1 Although off-road vehicle use has not been perceived to be a threat to skippers, if this determination should change, restrictions will be imposed as part of the Memorandum of Understanding between public lands agencies. The U.S. Forest Service has already placed restrictions

on off-road vehicle use in some parts of the South Platte River, especially in riparian areas.

5. Perform noxious weed control by hand.

5.1 Spot control of Russian thistle and other noxious weeds will be necessary to avoid broadcasting of herbicides that would affect Liatrus and grass species.

6. Encourage private landowners to voluntarily manage habitat:

6.1 Educate private landowners.

6.1.1 Educational materials involving habitat management for pawnee montane skippers will be developed and distributed to private landowners.

6.1.2 Public lands employees having contact with private landowners will emphasize the voluntary nature of the management suggestions and the importance of threatened and endangered species protection.

6.2 Seek conservation agreements.

Seek conservation agreements or habitat conservation plans with private landowners to protect skipper habitat.

7. Educate general public.

7.1 Educational materials describing public land management measures to protect the skipper and the importance of protecting endangered species will be developed and will be available through public agencies in the habitat area.

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PART III - IMPLEMENTATION SCHEDULE

The Implementation Schedule that follows outlines actions and costs for the recovery program. It is a guide for meeting the objectives elaborated in Part II of this plan. This schedule indicates the recovery plan tasks, corresponding outline numbers, task priorities, duration of tasks (“on-going” denotes a task that once begun, should continue on an annual basis), the responsible agencies, and lastly, estimated costs. These actions, when accomplished, should bring about the recovery of the Pawnee montane skipper and protect its habitat.

Key to Implementation Schedule Columns

Definition of Priorities

- Priority 1: All actions that must be taken to prevent extinction or to prevent the species from declining irreversibly in the foreseeable future.
- Priority 2: All actions that must be taken to prevent a significant decline in species population/habitat quality, or some other significant negative impact short of extinction.
- Priority 3: All actions necessary to provide for full recovery of the species.

Abbreviations Used in Implementation Schedule

DW	Denver Water
FS	U.S. Forest Service
JC	Jefferson County
DC	Douglas County
BLM	Bureau of Land Management
CSLD	Colorado State Land Board
CSFS	Colorado State Forest Service
FWS	U.S. Fish and Wildlife Service

Pawnee Montane Skipper Recovery Implementation Schedule

Priority	Task	Task Description	Responsible Party		Cost Estimates (000's)			Duration	Comments
			FWS Region	Other	FY-01	FY-02	FY-03		
1	1.	Create MOU	6	FS, DW, JC, FWS, DC, BLM, CSFS, CSLB	15			on-going	Agency staff time
1	1.1	Modify activities major effects	6	DW, FS, JC	5			on-going	Agency planning, consultation If necessary, mitigation
2	1.2	Control activities moderate effects	6	DW, FS, JC	5			on-going	Agency planning, consultation
2	2.1	Monitor skipper presence	6	FS, JC	15			every 5 years	
2	2.2	Monitor habitat	6	FS, JC	15			every 5 years	
3	2.3	Determine disease, parasitism threat	6	FS, JC					Part of population and habitat survey
3	3.1	Determine effects of forest management		FS, JC	10	10	10	on-going	Staff time plus reseeding
3	3.2	Determine effects of recreation management		FS, JC	2	2	2	on-going	
3	3.3	Determine effects of off-road vehicle use		FS, JC	2	2	2	on-going	

Pawnee Montane Skipper Recovery Implementation Schedule - continued

Priority	Task	Task Description	Responsible Party		Cost Estimates (000's)			Duration	Comments
			FWS Region	Other	FY-01	FY-02	FY-03		
3	3.4	Determine effects of noxious weed control		FS, JC	2	2	2	on-going	
3	4.1	Skipper management education/landowners	6	FS, JC	5	1	1	on-going	Development of materials, printing, distribution
3	4.2	Seek conservation easements	6					on-going	If necessary to protect private habitat on private land
3	4.3	Educate general public	6	FS, JC	5	2	2	on-going	Development of materials, printing, distribution

PART IV - SUMMARY OF PUBLIC COMMENTS

This recovery plan was made available to the public for comment as required by the 1988 amendments to the Endangered Species Act of 1973. The public comment period was announced in the Federal Register (Volume 63, Number 22) on February 3, 1998 and closed on June 3, 1998.

During the public comment period one letter was received. The respondent suggested ways to study the life history and ecology of the skipper. The suggestions will be reviewed when a study plan is developed for monitoring skipper presence at regular five year intervals.

**U.S. Fish and Wildlife Service
Mountain-Prairie Regional Office
PO Box 25486, Denver Federal Center
Denver, CO 80207
303/236-8145**

<http://www.fws.gov>

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